

## Krauss-Maffei Peeler Centrifuge HZ

Performance you can rely on





## Table of Content

Krauss-Maffei Peeler Centrifuge HZ	3
Process Advantages	4
Basket Designs	5
Operation	6
Centrifuge Controls	8
Process Automation	9
Foundation/Installation	10
Dimensions and Weights	11
Technical Data	11
Test Centers	12
Services	13
Company Profile	14
Product Lines	15

# Krauss-Maffei Peeler Centrifuge HZ

## Maximum Efficiency

Krauss-Maffei Horizontal Peeler Centrifuges are batch operated filtration centrifuges known for their reliable performance at high capacities. They are used in many processes, primarily in the bulk chemicals, fine chemicals and food industries.

The horizontal rotor assembly is cantilever mounted and, depending on the application, can be provided with a conventional filtration basket or a specially designed rotary siphon basket. A fully opening housing door provides access to the basket and all process components for maintenance. Adding variable speed drives and custom-tailored controls and instrumentation

enables the peeler centrifuge to be optimally adapted to a multitude of processing requirements for peak performance.

## Proven Technology

Peeler centrifuges are used to separate suspended solids from liquids by means of centrifugal filtration. Krauss-Maffei Peeler Centrifuges have proven their operational efficiency in over 2,500 different applications at customers all over the world for more than 75 years.



Krauss-Maffei  
Peeler Centrifuge HZ 125/3,2 Si

## Applications

### Bulk Chemicals

Petrochemical intermediates, fertilizers, chlorides, sulfates, calcium compounds, sodium compounds, etc.

### Fine Chemicals

Aluminum fluoride, amino acids, bleaching agents, surfactants, herbicides, pesticides, catalysts, dyestuffs, stearates, etc.

### Pharmaceuticals/related

API's, vitamins, salicylic acid, citric acid, ascorbic acid, calcium citrate, antibiotics, etc.

### Plastics/related

ABS, resins, melamine, PE, PP, antioxidant agents, etc.

### Foodstuff/related

Native and modified starches, artificial sweeteners, vanillin, caffeine, etc.

## Processing Parameters

### Average Particle Size

2-500  $\mu\text{m}$

### Feed Solids Concentration

from 3.0% wt

### Solids Throughput

up to 15 t/h

### Materials of Construction

for process wetted parts:

- various grades of stainless steel
- nickel-based alloys
- special metals with or without lining

# Process Advantages

## Your Benefits

### ■ Unequaled flexibility

Krauss-Maffei Peeler Centrifuges can be easily adapted to changing process requirements. Different control recipes can be used to select the optimum operating speed and cycle sequence for yielding the highest product quality at peak capacity.

### ■ Lower residual cake moisture

Due to high centrifugal forces.

### ■ Excellent wash results

Through even distribution of wash liquid due to horizontal basket configuration and introduction via feed distributor or spray bars.

### Krauss-Maffei Peeler Centrifuges with Rotary Siphon

By utilizing the rotary siphon feature, an original KMPT development, the overall performance of the peeler centrifuge can be improved considerably. Substantial advantages include:

### ■ Increased filtration capacity

The creation of a vacuum beneath the filter cloth increases the filtration pressure and boosts the filtration rate.

### ■ Superior product purity

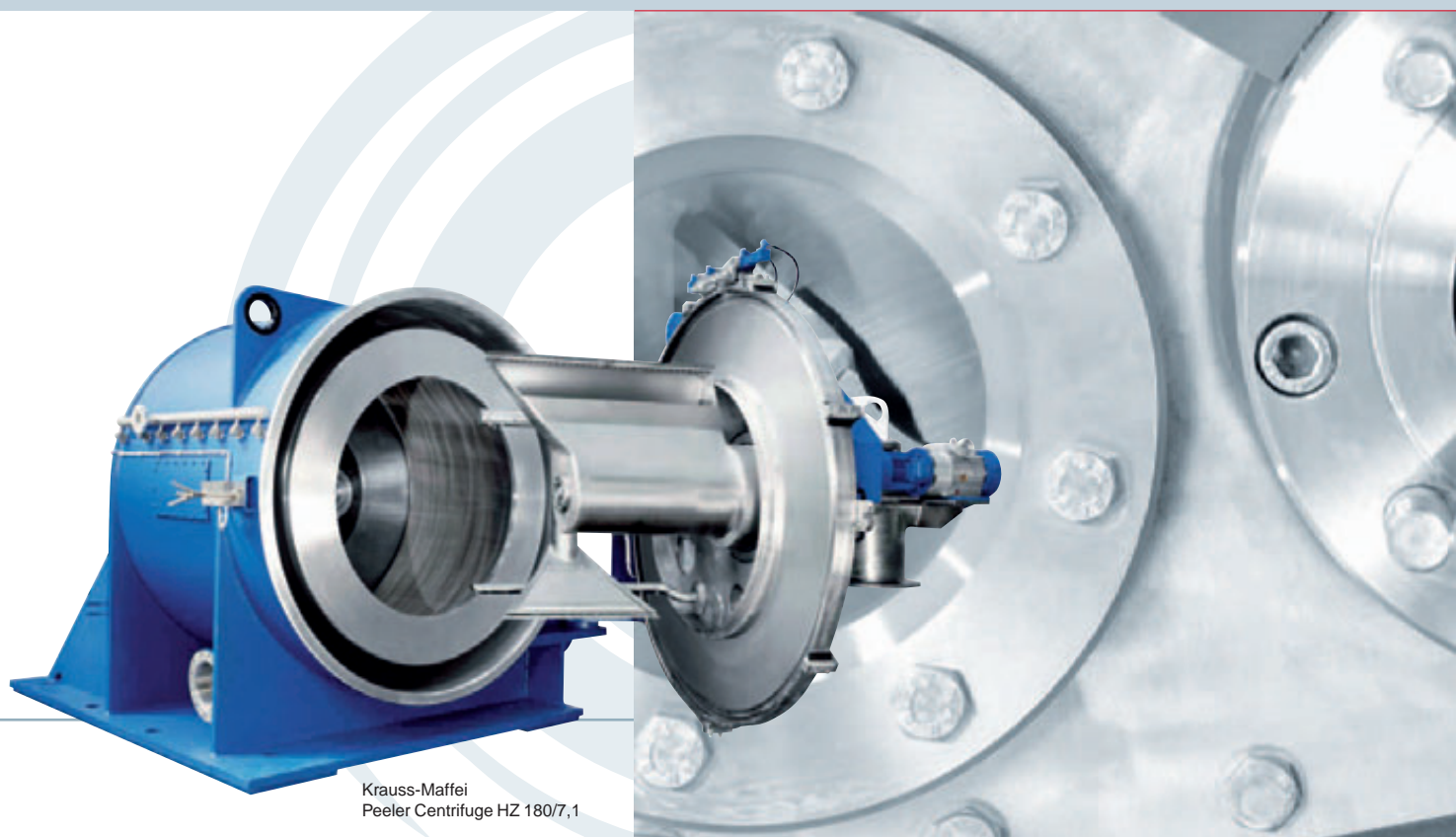
The filtration rate can be adjusted to prolong the contact time between wash liquid and solids to produce a purer cake.

### ■ Extended service life of residual heel

Regeneration of the residual heel is achieved by means of backwashing through the filter medium.

### ■ Smoother operation

Through backwashing and throttling of the filtration rate, the siphon feature enables feeding into a liquid pool for uniform distribution of solids without vibration even with fast filtering products.



Krauss-Maffei  
Peeler Centrifuge HZ 180/7,1

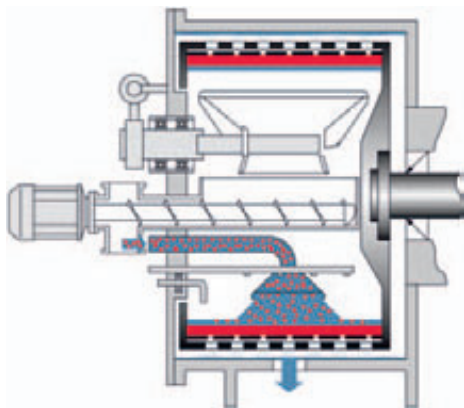


## Basket Designs

Krauss-Maffei Peeler Centrifuges are furnished with various basket designs. The versions most frequently applied are the conventional filtration basket and the rotary siphon basket, an original KMPT development.

### Filtration Basket

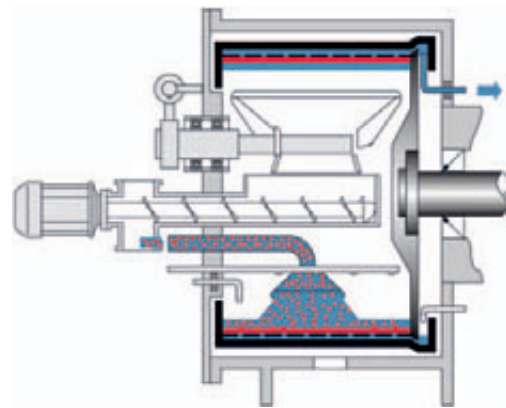
Of fabricated/welded or cast design, the filtration basket has a cylindrical shell with filtrate bores through which the filtrate, after passing through the filter medium, is spun out into the filtrate housing.



Filtration basket

### Rotary Siphon Basket

Contrary to the conventional perforated basket, the rotary siphon basket has a solid cylindrical shell with filtrate bores arranged radially at the rear end of the basket where they are connected to a siphon shaped chamber. The filtrate, once it has penetrated the filter cake and the filter medium, is redirected via axial channels beneath filter medium support segments into the siphon chamber where a pivoting skimmer pipe extracts it from the centrifuge under positive pressure. The radial distance between the filter medium and the liquid level in the siphon chamber increases the driving force and thus the filtration rate.

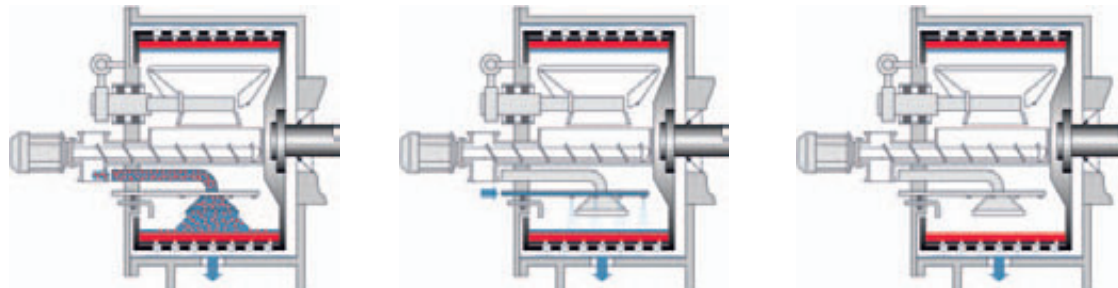


Rotary siphon basket

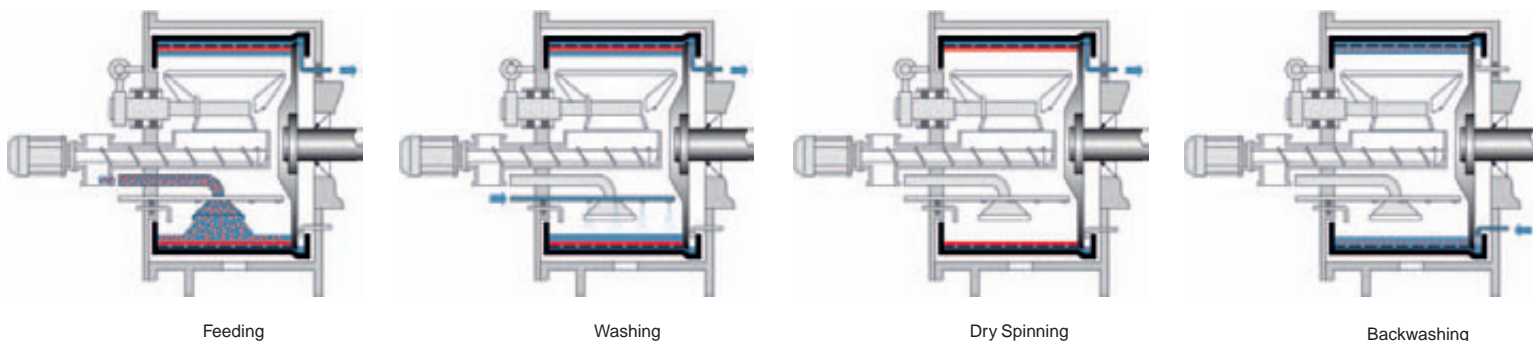


# Operation

## Filtration Basket



## Siphon Basket



## Operating Sequence

### Feeding

The suspension is introduced into the rotating centrifuge basket via the feed distributor. Typically, this would include several intermittent feed pulses to prevent the suspension from spilling over the basket rim. The fill level is monitored and regulated by a feed controller. Normally, the basket is filled with solids up to 75-80% of the basket rim height. The feed step is completed when the filter cake has reached the desired level.

### Filtration

The primary filtration of the mother liquor through the filter medium installed in the basket begins with the feed step, and ends once the liquor has immersed into the filter cake. Solids retained on the filter medium after completion of a cycle and discharge of product serve as a filter medium for subsequent cycles.

### Washing

A cake wash step will often follow the primary filtration step. Wash liquid is introduced through the feed distributor or, for lower wash rates, through a separate spray bar. The wash liquid level is again monitored by the feed controller and the wash step is concluded once the predetermined amount of

wash liquid has been used and the liquid immerses into the filter cake.

### Dry Spinning

Immediately following the feed and wash step, which may be carried out at a lower speed, the basket will be accelerated to maximum allowable speed for the cake dry spinning step which ends once the desired residual cake moisture has been reached, or a predetermined period of spin time has expired.

### Peeling/Cake Discharge

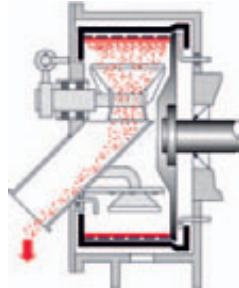
At the end of each centrifuge cycle the filter cake is removed from the basket by a pivoting peeling device equipped with a broad peeler knife. Depending on the product characteristics, the peeling motion is conducted at full or reduced basket speed with adjustable swivel advance velocity. The scraped layers of product are diverted into a trough and discharged from the centrifuge through an inclined chute or a horizontal screw conveyor. To protect the filter medium, a thin layer of filter cake is retained in the basket. This layer, called the residual heel, becomes the filter aid for subsequent cycles.

### ■ Discharge Chute

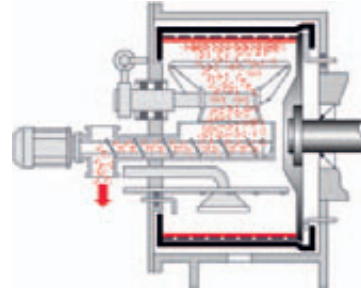
The peeled solids are accumulated and channeled to the outside of the centrifuge by an inclining chute mounted on the housing door below the peeling device.

# Operation

## Peeling/Cake Discharge

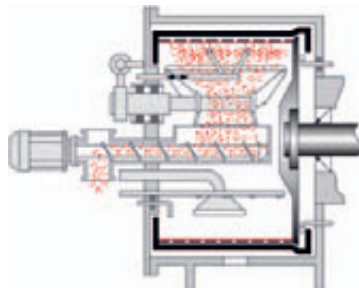


Discharge Chute

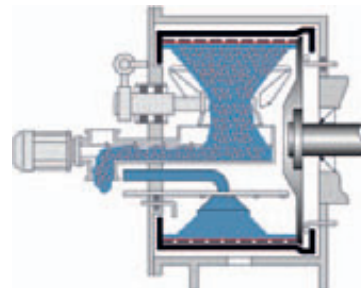


Screw Conveyor

## Residual Heel Removal



Pneumatic



Hydraulic

### ■ Screw Conveyor

The peeled product is diverted to a horizontal, door mounted screw conveyor which conveys the solids to the outside of the centrifuge. Advantages of the screw conveyor are:

- Higher centrifuge throughput due to the potential of utilizing longer baskets.
- Usable for applications for solids exhibiting a tendency for adhesion and with increased internal friction factors, both affecting gravity flow inherent to chute discharge configuration.

### Backwashing

With the rotary siphon basket it is possible to feed backwash liquid from an overhead mounted prime tank through the siphon chamber to permeate the residual heel from underneath. This process re-suspends the residual heel and restores its permeability. It also primes the rotary siphon for the next filtration cycle. The liquid pool on top of the heel created through backwashing will assist in evenly distributing the subsequent cycle's incoming suspension, which will virtually eliminate the potential for imbalances during the feed step.

### Residual Heel Removal

After frequent cycles, the residual heel may have compacted with enough fine solids to make it impermeable, resulting in poor filtration performance. When this occurs, the heel may be regenerated (by backwashing in siphon peeler cen-

trifuges) or removed pneumatically or hydraulically (in peeler centrifuges with filtration baskets).

### ■ Pneumatic Heel Removal

By blowing either compressed air or nitrogen against the heel through special flat-jet nozzles mounted on a pivoting and oscillating manifold inside the basket, the heel cake is broken up into pieces and discharged through the peeling device.

### ■ Hydraulic Heel Removal

Using the feed distributor, a large quantity of rinse liquid is introduced into the basket for a short period of time. The resulting shear forces create sufficient turbulence to lift the heel from the filter medium. The rinse liquid with the dispersed heel solids is discharged from the basket through the peeling device. This step requires a diversion of the liquid outside of the centrifuge away from the normal dry product discharge. The rinse liquid can be recycled to the main process or divided into heel solids and liquid in a separate process step.

In both procedures, the heel is removed at low basket speeds to prevent tearing of the filter medium. The hydraulic heel removal step has the added advantage of simultaneously cleaning the centrifuge interior. The most suitable removal procedure will depend upon the specific application.

# Centrifuge Controls

Automatic and optimum operation of the centrifuge to yield a product with uniform quality at maximum capacity requires a sophisticated system for continuously monitoring and controlling a number of process and operating parameters, such as:

- Basket speed
- Feed time and basket fill level
- Filtration rate and spin time
- Wash ratio and wash time
- Safety related inputs, interlocks, position indicators, and other process-related instrument signals

Typically, Krauss-Maffei Peeler Centrifuges are provided with variable frequency drives for operating the centrifuge within a speed range best suited for each application and/or step in the process cycle. Programmable control electronics housed in local operator panels and/or in remote control cabinets evaluate the process signals and adapt process parameters on a result-dependent basis.

The core controlling devices in peeler centrifuges are feed controllers which provide the feed back signals for controlling the supply of product suspension, wash liquid, etc. to the centrifuge.



FKR



TFKR



UFKR

Feed Controllers are available in various configurations:

## Standard Paddle Feed Controller FKR

With spring-loaded/hydraulic pivoting motion or fully pneumatic operation.

## Thermal Feed Controller TFKR

The sensor arm of the TFKR with an embedded thermocouple is pivoted in and out at adjustable, regular intervals to touch the surface of the basket filling. The frictional heat between the sensor and the product generates a temperature signal which is conditioned and evaluated by an electronic controls module.

### The advantages of the TFKR are:

- The sensor can differentiate whether it touches a plane of liquid or the surface of solids due to the different frictional heat created by the contact. It can also determine both the level of basket filling and the filtrate immersion point which signals the end of the filtration or wash step.

- Adjustable immersion frequency and contact time of the TFKR sensor provides a much more precise feedback of the prevalent processing conditions and allows for faster, more efficient centrifuge cycles.

## Ultrasonic Feed Controller UFKR

The ultrasonic controller is a contact-free measurement system to detect the fill level in the basket. An ultrasonic probe emits a signal in the direction of the product in the basket. The signal reflected by the rising product is picked up by a sensor and analyzed by control electronics.

### The patented UFKR system by KMPT offers the following benefits:

- Continuous level detection
- No mechanical contact with the product, eliminating splashing or dusting
- No mechanical wear of sensors, eliminating potential product contamination from eroded metal particles
- No dynamic seals
- Unobtrusive installation into the process area



# Process Automation

## KMPT Process Automation

Perfection in process engineering requires perfection in process automation. The superior performance of our process equipment is based on perfecting the interface between equipment hardware, electrical components, electronics, informatics and process know-how to create an all-encompassing custom tailored solution for each application. Using intelligent sensors and state-of-the-art communication systems we control and monitor our machines on a result-oriented basis.

### The benefits of our Process Automation are:

- Enhanced equipment performance
- Consistent high product quality
- Reduced consumption of utilities
- Optional condition diagnostics

## Automation of Machines

Individual adaptation – we can incorporate the automation concepts for our machine in your existing control system.

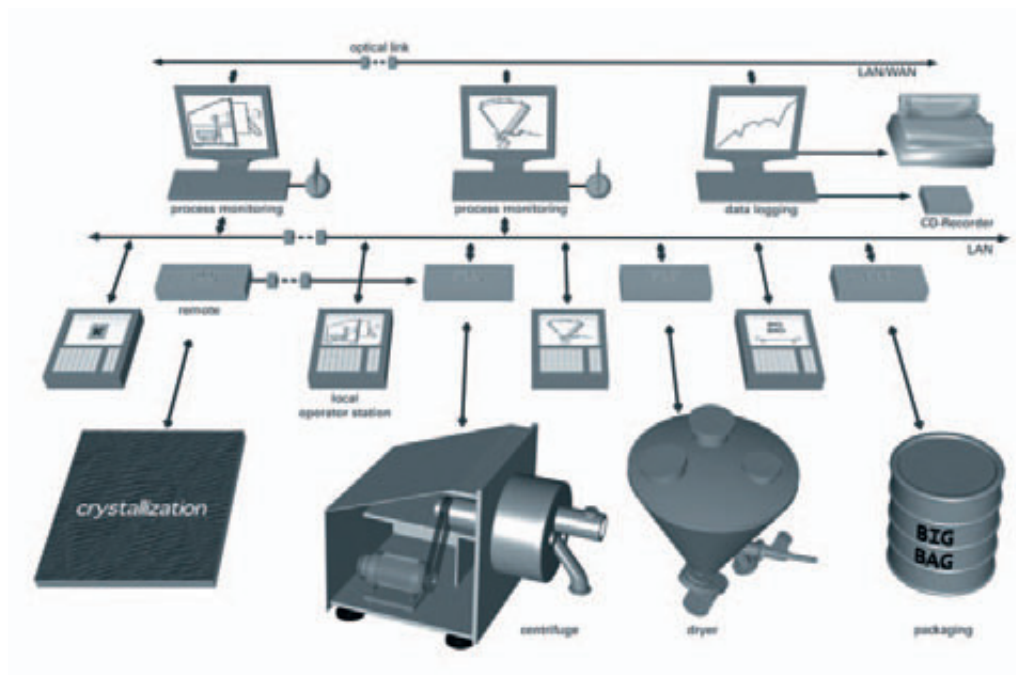
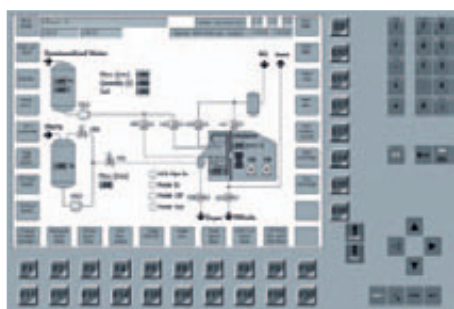
## Custom Concepts

We provide an individually designed service package to fit your specification – from the control of individual units, to the incorporation into existing control systems or the automation of complete plants ready for operation.

## Services

Based on your quality assurance program, we prepare all the required documents for validation and qualification of the software and hardware automation. Our extensive know-how, profound experience and innovative drive qualifies us as your partner for the validation of our equipment for your production needs.

Machinery Directives, ATEX, hazardous location regulations – there are many regulations to be met at the plant site. We are there to serve as your knowledgeable advisor for the safety of your plant.



## Foundation/Installation

Rotation of a centrifuge basket produces not only the centrifugal forces necessary for the separation of solids from liquids, but also high dynamic forces from the acceleration of considerable masses such as the weight of the basket and its filling with product. Uneven distribution of the product within the basket creates imbalance forces which will be transmitted to the structure supporting the centrifuge. To keep the dynamic forces exerted on the structure to a minimum, the centrifuge is best mounted on an isolation system which consists of additional mass (in the form of a steel or inertia block) supported by spring and damper elements.

### Important installation guidelines are:

- The feed pressure should be around 0.5 bar
- Keep all supply and discharge lines short and with a maximum gradient
- All attachments to the centrifuge must be flexible
- Provide for fast draining of all pipes by either venting or pressure compensation in closed loop systems
- Install sight glasses and sample ports in all supply and discharge lines
- Provide vertical solids drop without cross-sectional restrictions



Krauss-Maffei Peeler Centrifuge HZ  
100/2,0 installed on inertia block

# Dimensions and Weights

1) For operation and maintenance.  
2)  $l_1$  may vary with discharge option.

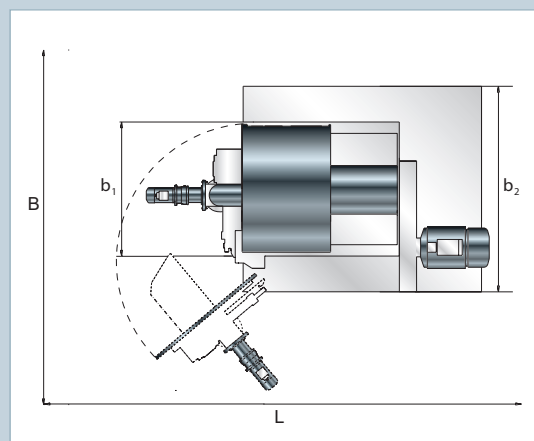
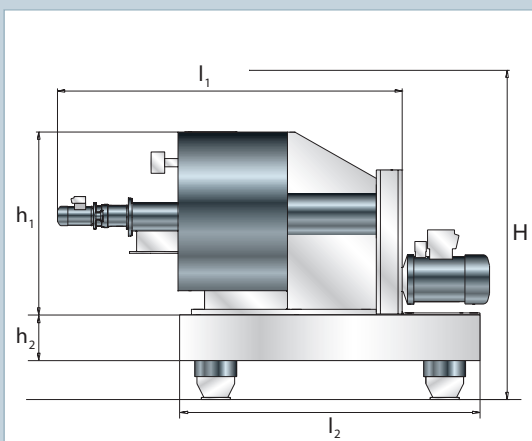
Centrifuge model	Machine dimensions			Inertia block dimensions			Space requirements <sup>1)</sup>			Weight without motor [kg]	Weight with inertia block and drive [kg]
	$l_1$ <sup>2)</sup> [mm]	$b_1$ [mm]	$h_1$ [mm]	$l_2$ [mm]	$b_2$ [mm]	$h_2$ [mm]	L [mm]	B [mm]	H [mm]		
HZ 25/0,1	670	500	550	-	-	-	1000	1100	1400	75	160
HZ 40/0,2	1000	720	750	800	1200	60	1500	1300	1800	500	1350
HZ 63/0,3	1500	1100	1100	1650	1600	260	3600	3000	1800	1250	2800
HZ 63/0,6	1600	1100	1100	1650	1600	260	3700	3000	1800	1350	3500
HZ 80/1,0	2100	1400	1300	2050	2100	400	4300	3500	2500	2600	6000
HZ 80/1,3	2400	1400	1300	2050	2100	400	4700	3500	2500	3000	7300
HZ 100/1,6	2600	1650	1600	2400	2400	680	5200	3800	3000	3500	12000
HZ 100/2,0	2800	1650	1600	2400	2400	680	5400	3800	3000	4100	12500
HZ 125/2,5	2900	1900	1800	2600	2500	650	5900	4700	3500	5500	15000
HZ 125/3,2	3400	1900	1850	2900	2500	650	6300	4700	3500	7000	19000
HZ 160/4,0	3600	2300	2200	3200	3200	750	6700	5600	4400	10000	31000
HZ 160/5,0	4000	2300	2300	3500	3200	750	7200	5600	4500	13000	36000
HZ 180/7,1	4700	3000	3000	4650	3600	700	8600	6600	5300	23500	55700

## Technical Data

3) Calculated for a load density of saturated filter cake at 1250 kg/m<sup>3</sup> at 50°C for 316 L stainless steel basket.

Centrifuge model	Basket inside diameter [mm]	Basket length [mm]	Basket volume [l]	Filter area [m <sup>2</sup> ]	Max. g-force <sup>3)</sup> [-]	Maximum speed <sup>3)</sup> [rpm]
HZ 25/0,1	250	125	2,5	0,10	2200	4000
HZ 40/0,2	400	200	9,8	0,25	2000	3000
HZ 63/0,3	630	160	20,6	0,32	1700	2200
HZ 63/0,6	630	315	40,5	0,62	2020	2400
HZ 80/1,0	800	400	83,0	1,01	1600	1900
HZ 80/1,3	800	500	103,7	1,26	1600	1900
HZ 100/1,6	1000	500	164,0	1,57	1290	1520
HZ 100/2,0	1000	630	206,6	1,98	1290	1520
HZ 125/2,5	1250	630	323,6	2,46	1030	1220
HZ 125/3,2	1250	800	410,9	3,14	1030	1220
HZ 160/4,0	1600	800	683,6	4,02	805	950
HZ 160/5,0	1600	1000	854,6	5,03	805	950
HZ 180/7,1	1800	1250	1350,0	7,07	710	840

All technical data are approximate and subject to change without notice.





## Test Centers

KMPT operates fully equipped Test Centers in Germany and the USA, offering both bench and pilot scale equipment. Our experienced engineers will consult with you to determine the equipment most appropriate for your product, then will perform the necessary trials to optimize the operating conditions for your process. Based on these tests, we will provide a

complete report which will recommend the best solution for your solid/liquid separation process, including scale-up information for the production equipment.

We can also assist in running long term trials at your site with equipment from our rental machine pool.





## Services

Our goal is to provide our customers with fast and reliable service, from the first process consultation throughout the entire service life of your KMPT process equipment.

To assist our global customer base, we operate ten service facilities around the world staffed with experienced, dedicated service teams.

### ■ Spare Parts

We keep over 6,000 different spare parts and components in stock for you. Our service centers in the USA, Great Britain, Italy, France, China, and elsewhere maintain their own spare parts stock to enable faster delivery to your plant site.

### ■ Repairs & Maintenance

Our service centers are ready to provide you with regularly scheduled maintenance or emergency service at your site. Our experts provide assistance including assembly work, installation support, commissioning, upgrades, repair work and optimization of your process conditions.

### ■ Advisory Service

Our customer service team is ready to answer any question concerning machine safety, equipment upgrades and process optimization.

### ■ Reconditioned Units

We maintain a select stock of reconditioned units available for fast delivery from our facility. All machines are fully disassembled, inspected and reconditioned by replacing worn or damaged parts. A final test run validates the mechanical guarantee we provide with our refurbished equipment. With our factory reconditioned units you gain production capacity quickly with minimal capital investment.

### ■ Installation and Commissioning

Our experienced service personnel assists you in the installation and start-up of your equipment.

### ■ Remote Diagnostics

Using modern communications and diagnostic systems our customer service is able to offer even faster and more efficient support. Via remote access our specialists can receive information on the operating condition of your machine and carry out fault diagnoses. Maximum data security is of course guaranteed at all times. We only access the data from your machine when you give your specific approval to do so.

### ■ 24-hour On-Call Service

You can reach our skilled and experienced service team around the clock.

### ■ Maintenance Contracts

We offer you tailor-made long term contracts for preventative maintenance of your equipment.

### ■ Customer Training

We train your operating personnel during the commissioning of the plant. In addition, we also offer you seminars for maintenance and operation of our entire line of process equipment. This training can be conducted at our site or yours.

## Company Profile

KMPT has been a world leader and innovator in the chemical process industry for over 75 years. The extensive experience of our engineers comes from testing more than 3000 products and putting over 9000 applications to work. Over 500 patents demonstrate our capacity for innovation.

This extensive knowledge governs our process and equipment recommendations, all tailored to meet our customers' requirements with an optimum in performance and cost. Starting with the initial project planning stage through start-up and operation of the equipment, KMPT is your partner of choice for solid/liquid separation technology.





## Product Lines

### ■ Krauss Maffei Centrifuges

With Horizontal Peeler Centrifuges known for reliability, Pharma Centrifuges designed to meet highest quality standards, innovative Vertical Basket Centrifuges and continuously operating Pusher Centrifuges, KMPT has the capability to handle a broad range of separation applications in the chemicals, pharmaceuticals and environmental industries.

### ■ Krauss Maffei Filters

For vacuum or pressure filtration, our Rotary Drum and Disk Filters combine high yield with low production costs in the processing of chemicals, plastics and minerals.

### ■ Krauss Maffei Dryers

Batch drying in our Conical Mixer Dryer (with screw or helical mixing assembly) or continuous drying of free-flowing materials in our Plate Dryer – we offer the right choice of dryers for fine chemical and pharmaceutical producers.

### ■ Krauss Maffei Process Systems

We apply our experience and expertise to create fully functional processing modules including peripherals and automation, saving the customer from having to deal with multiple vendors. KMPT provides all the detailed engineering and reduces installation time with pre-assembled systems.



**KMPT AG**

Industriestraße 1-3  
85256 Vierkirchen  
Germany  
Phone: +49 (0) 8139 80299 - 0  
Fax: +49 (0) 8139 80299 - 952  
marketing@kmpt.com  
www.kmpt.com

## Worldwide Company Locations and Representative Offices

**KMPT France S.A.S.**

L'Espace Media  
3, rue Gustave Eiffel  
Le Technoparc  
78306 Poissy Cédex  
France  
Phone: +33 1 39 22 64 37  
Fax: +33 1 39 22 39 92  
roger.fritz@kmpt.fr  
www.kmpt.com

**KMPT Italia S.r.l.**

Via Ripamonti, 129  
20141 Milano  
Italy  
Phone: +39 02 57 43 01 1  
Fax: +39 02 56 81 42 58  
kmpt@it.kmpt.com  
www.kmpt.it

**KMPT UK Ltd.**

Gemini Business Park  
Europa Boulevard  
Warrington WA5 7TR  
Great Britain  
Phone: +44 19 25 64 41 55-00  
Fax: +44 19 25 57 34 35  
info@kmpt.co.uk  
www.kmpt.co.uk

**KMPT USA Inc.**

8070 Production Drive  
Florence, KY 41042  
USA  
Phone: +1 859 547-1100  
Fax: +1 859 547-1098  
sales@kmpt.net  
www.kmpt.net

**KMPT AG**

**Beijing Representative Office**

Air China Plaza 2109  
36# Xiao Yun Road  
Chaoyang District  
100027 Beijing  
China P.R.  
Phone: +86 10 84 47 58-80/81/82  
Fax: +86 10 84 47 58-83  
yang@kmpt.com.cn  
www.kmpt.com.cn

**KMPT AG Liaison Office India**

304, Dheeraj Kawal  
L.B.S.Marg, Vikhroli(W)  
Mumbai 400 079  
India  
Phone: +91 22 25 79 51-34  
Fax: +91 22 25 79 51-35  
j.ganesh@kmpt.in  
www.kmpt.com

**Representative Office of**

**KMPT AG in St. Petersburg**

190031 St. Petersburg  
ul. Efimova 4a, Lit. A, Office 317  
Russia  
Phone: +7 81 24 41 36-73  
Fax: +7 81 24 41 36-74  
nikolai.kamaev@kmpt.ru  
www.kmpt.ru